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# UTILITY PATENT APPLICATION TRANSMITTAL

## (Large Entity)

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Docket No.

476

Total Pages in this Submission

**TO THE ASSISTANT COMMISSIONER FOR PATENTS**

Box Patent Application

Washington, D.C. 20231

Transmitted herewith for filing under 35 U.S.C. 111(a) and 37 C.F.R. 1.53(b) is a new utility patent application for an invention entitled:

**HAND-HELD DRILLING OR PERCUSSION DRILLING MACHINE**

and invented by:

**Karin BIEBER, Thomas ISELI**If a **CONTINUATION APPLICATION**, check appropriate box and supply the requisite information:
☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Which is a:

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Which is a:

☒ Continuation ☐ Divisional ☐ Continuation-in-part (CIP) of prior application No.: \_\_\_\_\_

Enclosed are:

**Application Elements**

1. ☒ Filing fee as calculated and transmitted as described below
2. ☒ Specification having 16 pages and including the following:
  - a. ☒ Descriptive Title of the Invention
  - b. ☐ Cross References to Related Applications (if applicable)
  - c. ☐ Statement Regarding Federally-sponsored Research/Development (if applicable)
  - d. ☐ Reference to Microfiche Appendix (if applicable)
  - e. ☒ Background of the Invention
  - f. ☒ Brief Summary of the Invention
  - g. ☒ Brief Description of the Drawings (if drawings filed)
  - h. ☒ Detailed Description
  - i. ☒ Claim(s) as Classified Below
  - j. ☒ Abstract of the Disclosure

**Express Mail Mailing Label**Number EJ 523567420 USDate of Deposit JAN 22 1999

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 on the date indicated above and is addressed to the: Assistant Commissioner for Patents, Washington, D.C. 20231.

**UTILITY PATENT APPLICATION TRANSMITTAL**  
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**Application Elements (Continued)**

3. ☒ Drawing(s) *(when necessary as prescribed by 35 USC 113)*
- a. ☒ Formal                      Number of Sheets 2
- b. ☐ Informal                      Number of Sheets \_\_\_\_\_
4. ☒ Oath or Declaration
- a. ☒ Newly executed *(original or copy)*                      ☐ Unexecuted
- b. ☐ Copy from a prior application (37 CFR 1.63(d)) *(for continuation/divisional application only)*
- c. ☒ With Power of Attorney                      ☐ Without Power of Attorney
- d. ☐ DELETION OF INVENTOR(S)  
Signed statement attached deleting inventor(s) named in the prior application,  
see 37 C.F.R. 1.63(d)(2) and 1.33(b).
5. ☐ Incorporation By Reference *(usable if Box 4b is checked)*  
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied  
under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby  
incorporated by reference therein.
6. ☐ Computer Program in Microfiche *(Appendix)*
7. ☐ Nucleotide and/or Amino Acid Sequence Submission *(if applicable, all must be included)*
- a. ☐ Paper Copy
- b. ☐ Computer Readable Copy *(identical to computer copy)*
- c. ☐ Statement Verifying Identical Paper and Computer Readable Copy

**Accompanying Application Parts**

8. ☒ Assignment Papers *(cover sheet & document(s))*
9. ☐ 37 CFR 3.73(B) Statement *(when there is an assignee)*
10. ☐ English Translation Document *(if applicable)*
11. ☒ Information Disclosure Statement/PTO-1449                      ☒ Copies of IDS Citations
12. ☐ Preliminary Amendment
13. ☒ Acknowledgment postcard
14. ☒ Certificate of Mailing
- ☐ First Class                      ☒ Express Mail *(Specify Label No.):* EJ 523567420 US

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**Accompanying Application Parts (Continued)**

15. ☒ Certified Copy of Priority Document(s) (if foreign priority is claimed)

16. ☐ Additional Enclosures (please identify below):

**Fee Calculation and Transmittal**

**CLAIMS AS FILED**

For	#Filed	#Allowed	#Extra	Rate	Fee
Total Claims	7	- 20 =	0	x \$22.00	\$0.00
Indep. Claims	1	- 3 =	0	x \$82.00	\$0.00
Multiple Dependent Claims (check if applicable) <input type="checkbox"/>					\$0.00
BASIC FEE					\$760.00
OTHER FEE (specify purpose) ASSIGNMENT RECORDATION					\$40.00
TOTAL FILING FEE					\$800.00

- ☒ A check in the amount of \$800.00 to cover the filing fee is enclosed.
- ☒ The Commissioner is hereby authorized to charge and credit Deposit Account No. 19-4675 as described below. A duplicate copy of this sheet is enclosed.
- ☐ Charge the amount of as filing fee.
- ☒ Credit any overpayment.
- ☒ Charge any additional filing fees required under 37 C.F.R. 1.16 and 1.17.
- ☐ Charge the issue fee set in 37 C.F.R. 1.18 at the mailing of the Notice of Allowance, pursuant to 37 C.F.R. 1.311(b).

  
Signature

Dated: JANUARY 22, 1999

cc:

BE IT KNOWN that We, ***Karin BIEBER and Thomas ISELI***,  
have invented certain new and useful improvements in

***HAND-GUIDED DRILLING OR PERCUSSION DRILLING MACHINE***

of which the following is a complete specification:

## BACKGROUND OF THE INVENTION

The present invention relates to a hand-guided drilling machine or percussion drilling machine.

German patent document DE-A 43 05 965 discloses a drilling machine which is provided with an arresting device for non-rotatably arresting a drilling spindle relative to a housing of the hand power tool, so that a drill chuck which is screwed with the drilling spindle is released from the drilling spindle and/or a tool can be clamped in the drilling chuck without a key. The known drilling machine has the disadvantage that the spindle arresting is released manually by a push button pressure. This poses the difficulty for the user to hold with one hand the tool or the tool chuck and with the other hand the drilling machine, in addition to the release the spindle arresting. Moreover, the presence of a safety device is required, to prevent that the spindle arresting is released during the rotatable drilling spindle.

U.S. patent no. 5,016, 591 discloses an accu-bar screwdriver, in which an arresting coupling is provided between an output shaft of a planetary transmission and a hexagonal screwing tool receptacle. It is designed so that the bar screwdriver can be used as a manual hand

screwdriver. The hexagonal receptacle is neither removable from the output shaft, nor a torque can be maintained during a tool exchange.

## SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a hand-guided drilling or percussion drilling machine, which avoids the disadvantages of the prior art.

5 In keeping with these objects and with others which will become apparent hereinafter, one feature of present invention resides, briefly stated, in a hand-guided drilling or percussion drilling machine in which the arresting device is arrested between the drilling spindle or an intermediate shaft connected with the drilling spindle and a machine housing or a component connected with it, and the arresting device during a torque  
10 transmission from the drive motor to the tool is opened automatically and during the torque transmission toward the tool holder in an opposite direction is blocked automatically.

15 When the machine is designed in accordance with the present invention, it has the advantage that the tool in the tool receptacle can be clamped without problems without key or the tool chuck can be released without problems from the drilling spindle, since the drilling spindle is automatically arrested. A separate operator for the operation for arresting of the drilling spindle is not needed. In addition, the safety devices for

preventing the rotary arresting with a rotatable drilling spindle are superfluous. The inventive drilling or percussion drilling machine therefore has a simpler construction and simpler operation.

5 It is especially advantageous when in accordance with the present invention, the arresting device is arranged on an intermediate shaft, since then the axial percussion movement of the drilling spindle does not provide a disturbing influence on the arresting of the drilling spindle.

10 It is also advantageous when in accordance with still a further embodiment of the present invention the intermediate shaft and the drilling spindle are coupled through a transmission connection with a negative transmission ratio, since then, in particular during screwing or unscrewing of the tool holder, opposite torque peaks are reduced.

15 The coupling claws of the arresting coupling on a toothed gear in accordance with another feature of the present invention provides for an especially simple construction of the arresting device. The toothed gear and the driver disc can be arranged on the same shaft so as to reduce components tolerances and to guarantee an especially reliable arresting.



The novel features which are considered as characteristic for the present invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings.

5

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a view showing a longitudinal section of a front part of a percussion drilling machine in accordance with the present invention;

Figure 2 is a view showing a section taken along the line II-II in Figure 1 of the inventive machine; and

Figure 3 is a view showing a section taken along the line III-III in Figure 2 of the inventive machine.

## DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 shows a percussion drilling machine which is identified with reference numeral 10. It has a drive motor 11 for a rotatable drive of a tool holder 12. The drive motor 11 is accommodated in a machine housing 26. It is in a transmission connection with a drilling spindle 13, with which the tool holder 12 is screwed through a thread 35.

The drive motor 11 has a motor shaft which at one end is connected with a drive pinion 15. The drive pinion 15 engages with a toothed gear 16 shown in Figure 2 and rotatably supported on an intermediate shaft 17. The intermediate shaft 17 has teeth 18, 19 which engage in a transmission gears 20, 21. The transmission gears are rotatably supported on the drilling spindle 13. The transmission gears 20, 21 are non-rotatably connected with the drilling spindle 13 by an axially displaceable driving key 23 located in a longitudinal groove 22 of the drilling spindle 13. The driving key 23 together with the transmission gears 20, 21 and a not shown actuating device, form a switching transmission 24 with two stages. A first stage (slow rotary speed) is formed by the gear pair 18, 20, while a second stage (fast rotary speed) is formed by the gear pair 19, 21. The transmission ratio of the transmission stages 18, 20 and 19, 21 is negative.

In other words, a transmission from the intermediate shaft 17 to the drilling spindle 13 results in a slowing action.

At the end of the drilling spindle 13 facing away from the tool holder 12, an arresting impact mechanism 28 is located. The arresting impact mechanism 28 is used for delivering axial impacts against the drilling spindle 13. The arresting impact mechanism 28 is turned off in a conventional manner, so that the percussion drilling machine 10 can be also used as a drilling machine with two stages.

The tool holder 12 is formed as a jaw chuck. It has chuck jaws 32 which are adjustable by a sleeve and a conical nut 30 non-rotatably connected with it. The shaft of a tool is clampable between the chuck jaws 32. A base body 33 of the tool holder 12 is screwed through a thread 35 on a threaded pin 34 of the drilling spindle 13 with high pre-tensioning. Therefore, the tool holder 12 and the drilling spindle 13 are fixed non-rotatably with one another during the use of the percussion drilling machine 10.

The toothed gear 16 is rotatably coupled with the intermediate shaft 17 through an arresting coupling 38 which is shown in section in Figure 3. The arresting coupling 38 has four claws 39a, b located at an end side

of the toothed gear 16 and extending parallel to one another. A disc 40 is inserted between the claws 39a, b and has two radially extending driver elements 41. The driver elements 41 are formed so that the disc is rotated to a limited extent between the neighboring claws 39a, b.

5                   The disc 40 has a substantially cylindrical basic form on its periphery at the connection to the driver elements 41, which transits then substantially centrally between the neighboring driver elements 41 into a flattening 42. The disc 40 is surrounded by an arresting ring 43 which is non-rotatably fixed in a housing projection 44 of the machine housing 26 by  
10                   radially extending projections 43a. The arresting ring 43 has a different radial distance to the disc 40. In the region of the driver element 41 a small movement gap is provided between the disc 40 and the arresting ring 43. A radial distance between the disc 40 and the arresting ring 43 is provided in the connected cylindrical region of the disc 40. It is sufficient to receive  
15                   the claws 39a, b, with a small movement gap. In the region of the flattening 42, a radial distance between the arresting ring 43 and the disc 40 increases. In this region a cylindrical roller bearing 42 with a small movement gap is received, with a diameter exceeding the radial thickness of the claws 39a, b.

The claws 39a, b are differently long in the peripheral direction. The diagonal opposite pairs 39a, or 39b have however the same length. The disc 40 is arranged on a bearing seat 25 of the intermediate shaft 17 with a geometrical form-locking connection. This means that a torque can be transmitted to the intermediate shaft 17 through the claws 39a, b and the driver elements 41.

In this case, the claws 39a, b act in a torque transmitting manner on the driver elements 41. The roller bodies 45 therefore are located before the corresponding neighboring claw 39a because of their inertia behavior. The neighboring claws 39b, hold then the roller bodies 45 in the region of the flattening 42 so that an unobjectionable torque transmission is guaranteed.

When the torque transmission is performed in an opposite direction from the tool holder 12, the driver elements 4 act in a torque-transmitting manner on the claws 39a, b. Due to their inertia, the roller bodies 45 are urged in direction toward the torque-transmitting claws 39a, b, and they are clamped between the arresting ring 42 and the disc 40. The disc 40 is therefore automatically arrested to be fixed with the housing. Due to the arresting, it is then possible, to apply an opposite torque on the drilling spindle 13 without manually loosening an arresting device, during clamping

or releasing a tool in the tool holder 12 or during screwing or unscrewing the tool holder 12 from the drilling spindle.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of constructions differing from the types described above.

While the invention has been illustrated and described as embodied in hand-guided drilling or percussion drilling machine, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can, by applying current knowledge, readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention.

What is claimed as new and desired to be protected by Letters Patent is set forth in the appended claims.

## CLAIMS

1                   1. A hand-guided drilling machine or percussion drilling  
2 machine, comprising a machine housing; a drilling spindle; a drive motor for  
3 rotatably driving said drilling spindle; a tool holder formed as a drilling chuck  
4 and screwed with said drilling spindle through a thread, said drilling spindle  
5 during exchanging a tool or exchanging said tool holder receiving a  
6 releasing or tightening moment; an arresting device non-rotatably coupling  
7 said drilling spindle relative to said machine housing; an intermediate shaft  
8 non-rotatably connected with said drilling spindle; a component connected  
9 with said machine housing; said arresting device being arranged between  
10 one element selected from the group consisting of said drilling spindle and  
11 said intermediate shaft and another element selected from the group  
12 consisting of said machine housing and said component, said arresting  
13 device automatically opening during a torque transmission from said drive  
14 motor to the tool and automatically closing during the torque transmission  
15 from said tool holder in an opposite direction.



1                                2. A hand-guide drilling machine as defined in claim 1, wherein  
2                                said arresting coupling is formed as a claw coupling including a plurality of  
3                                claws and a toothed gear so that said claws arranged at an end side of said  
4                                toothed gear and extend parallel to one another in an axial direction.

1                                3. A hand-guide drilling machine as defined in claim 1, wherein  
2                                said arresting coupling is arranged on said intermediate shaft; and further  
3                                comprising at least one transmission stage coupling said intermediate shaft  
4                                with said drilling spindle.

1                                4. A hand-guide drilling machine as defined in claim 3, wherein  
2                                said at least one transmission stage has a negative transmission ratio from  
3                                said intermediate shaft to said drilling spindle.

1                    5. A hand-guide drilling machine as defined in claim 1, wherein  
2                    said arresting coupling has a disc with a plurality of driver elements radially  
3                    projecting from said disc for torque transmission, said intermediate disc  
4                    having a bearing seat on which said disc is non-rotatably arranged.

1                    6. A hand-guide drilling machine as defined in claim 5, wherein  
2                    said intermediate shaft in the region of said bearing seat has a cross-section  
3                    which deviates from a cylindrical shape for forming a geometrical form-  
4                    locking connection with said disc.

1                    7. A hand-guide drilling machine as defined in claim 5,  
2                    wherein said disc and said toothed gear are supported on said intermediate  
3                    shaft.

## ABSTRACT OF THE DISCLOSURE

A hand-guided drilling machine or percussion drilling machine has a machine housing, a drilling spindle, a drive motor for rotatably driving the drilling spindle, a tool holder formed as a drilling chuck and screwed with the drilling spindle through a thread, the drilling spindle during exchanging a tool or exchanging the tool holder receiving a releasing or tightening moment, an arresting device non-rotatably coupling the drilling spindle relative to the machine housing, an intermediate shaft non-rotatably connected with the drilling spindle, a component connected with the machine housing, the arresting device being arranged between one element selected from the group consisting of the drilling spindle and the intermediate shaft and another element selected from the group consisting of the machine housing and the component, the arresting device automatically opening during a torque transmission from the drive motor to the tool and automatically closing during the torque transmission from the tool holder in an opposite direction.

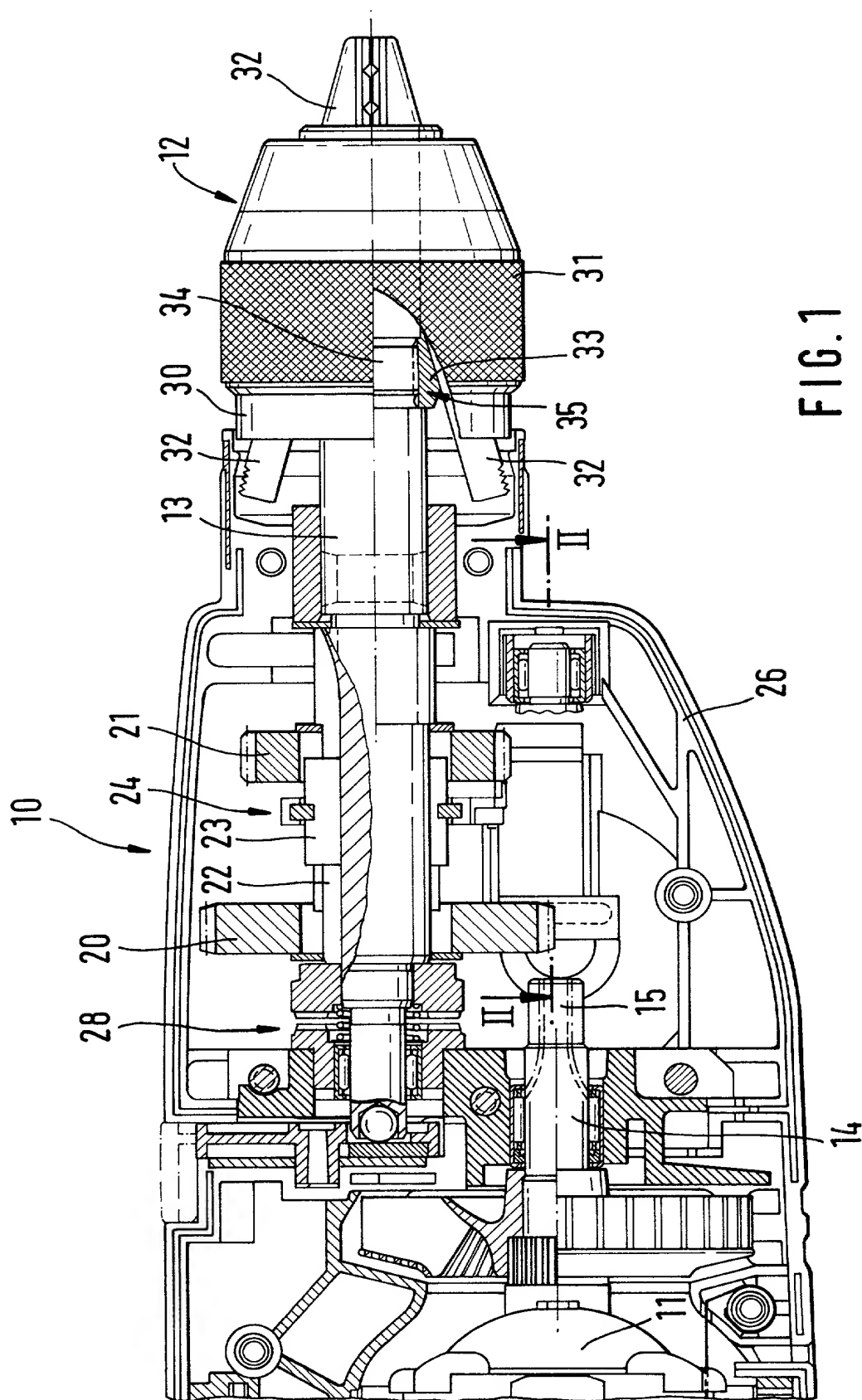
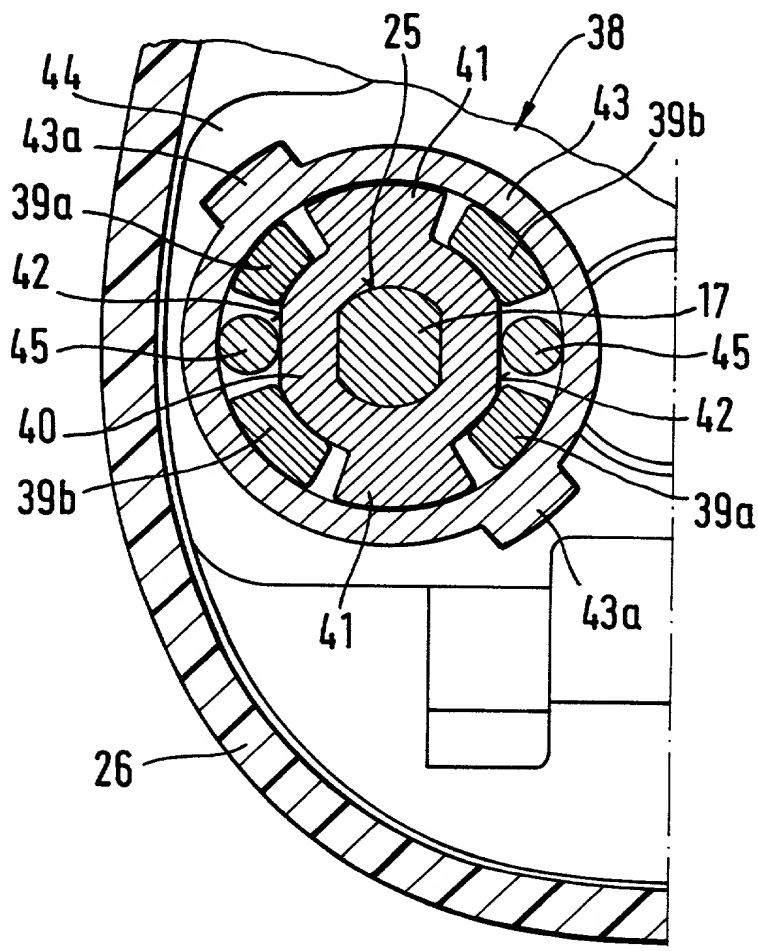
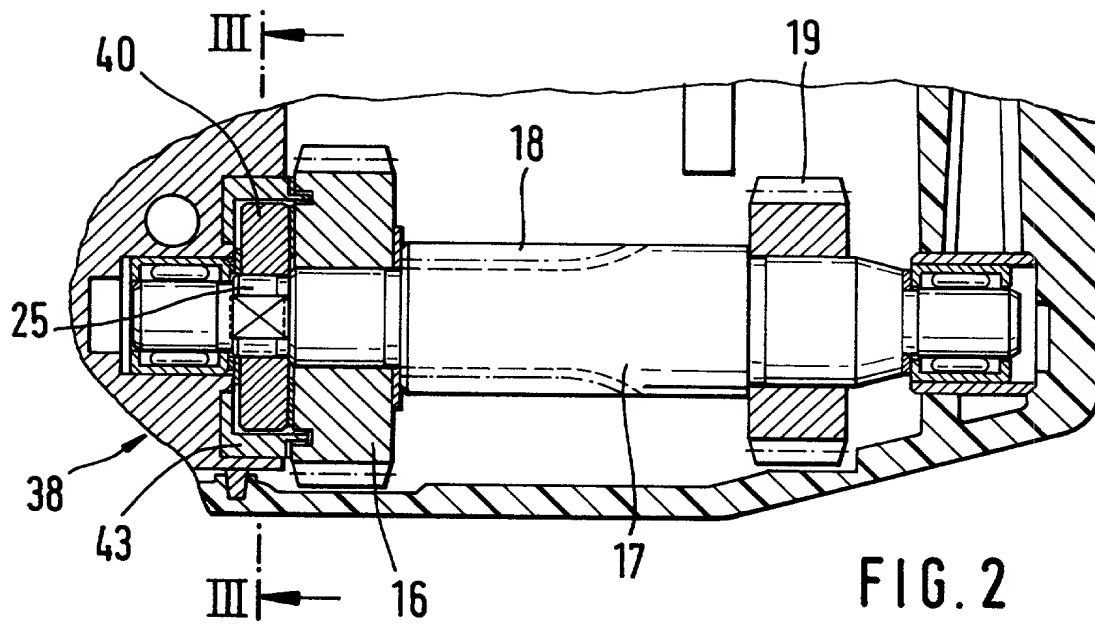


FIG. 1



COMBINED DECLARATION AND  
POWER OF ATTORNEY

ATTORNEY DOCKET NO. 476

As a below-named inventor, I hereby declare that:

Karin BIEBER  
Thomas ISELI

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention **HAND-GUIDED OR PERCUSSION DRILLING MACHINE** the specification of which:

(Check one) X is attached hereto.

\_\_\_\_\_ was filed on \_\_\_\_\_ as

Application Serial No. \_\_\_\_\_ and

was amended on \_\_\_\_\_  
(if applicable)

was amended through \_\_\_\_\_  
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose all information which is material to the patentability of this application in accordance with Title 37, Code of Federal Regulations, Section 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, Section § 119, of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Priority Claimed

<u>198 03 454.7</u>	<u>DE</u>	<u>JANUARY 30, 1998</u>	<u>X</u>	
Priority Number	Country	Date filed (Priority Date)	Yes	No
_____	_____	_____	_____	_____
Priority Number	Country	Date filed (Priority Date)	Yes	No
_____	_____	_____	_____	_____
Priority Number	Country	Date filed (Priority Date)	Yes	No
_____	_____	_____	_____	_____

I hereby claim the benefit under Title 35, United States Code, Section 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, Section 112, I acknowledge the duty to disclose material information as defined in Title 35, Code of Federal Regulations, Section 1.56(a), which occurred between the filing date of the

[illegible]

(Application Serial No.)	(Filing Date)	(Status - Patented, pending, abandoned)
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The undersigned hereby authorizes **Michael J. Striker** and the firm of **Striker, Striker & Stenby**, to accept and follow instructions from:

as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between Michael J. Striker, the firm of Striker, Striker & Stenby, and the undersigned. In the event of a change in the persons from whom instructions may be taken, Michael J. Striker and the firm of Striker, Striker & Stenby will be so notified by the undersigned.

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Address all correspondence to: Striker, Striker & Stenby  
103 East Neck Road  
Huntington, New York 11743  
U.S.A.

Signature: <i>Karin Bieber</i>	Date: 23.12.98	Residence and Full Postal Address: Dreisplatz 11 CH-4528 Zuchwil Switzerland
Full Name of First or Sole Inventor: Karin BIEBER	Citizenship: CH	
Signature: <i>Thomas Isele</i>	Date: 23.12.98	Residence and Full Postal Address: Rosenweg 1 CH-4512 Bellach Switzerland
Full Name of Second Inventor: Thomas ISELE	Citizenship: CH	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Third Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fourth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Fifth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Sixth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Seventh Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Eighth Inventor:	Citizenship:	
Signature:	Date:	Residence and Full Postal Address:
Full Name of Ninth Inventor:	Citizenship:	